

# NORTH BEACH & BLUFF REHABILITATION

## SCHEMATIC PLAN



**MILLER**  
ENGINEERS  
SCIENTISTS

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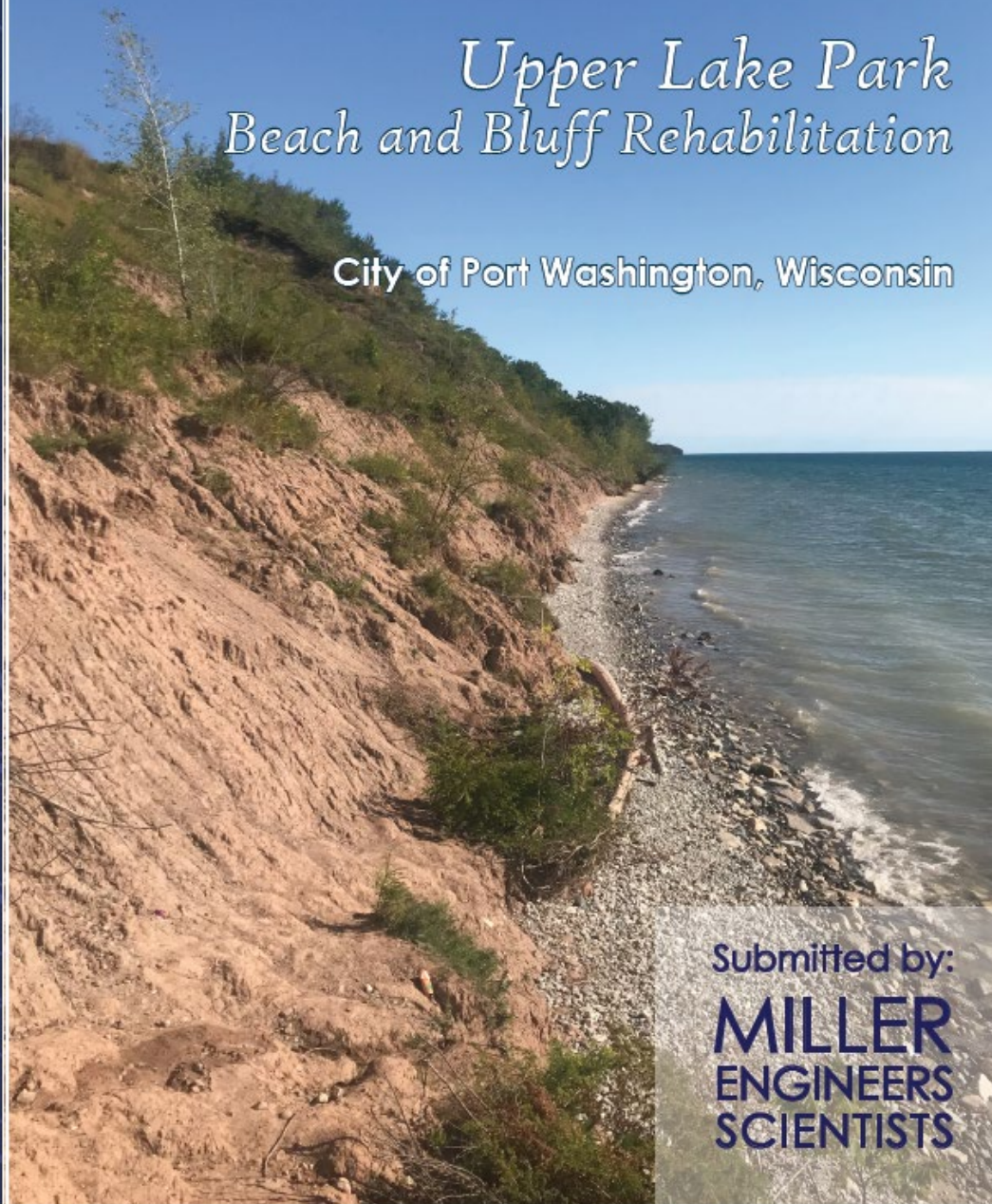
**Fund for  
Lake Michigan**

Clearly making a deep impact.

Schematic Engineering Planning Proposal

*Upper Lake Park  
Beach and Bluff Rehabilitation*

City of Port Washington, Wisconsin



Submitted by:

**MILLER  
ENGINEERS  
SCIENTISTS**

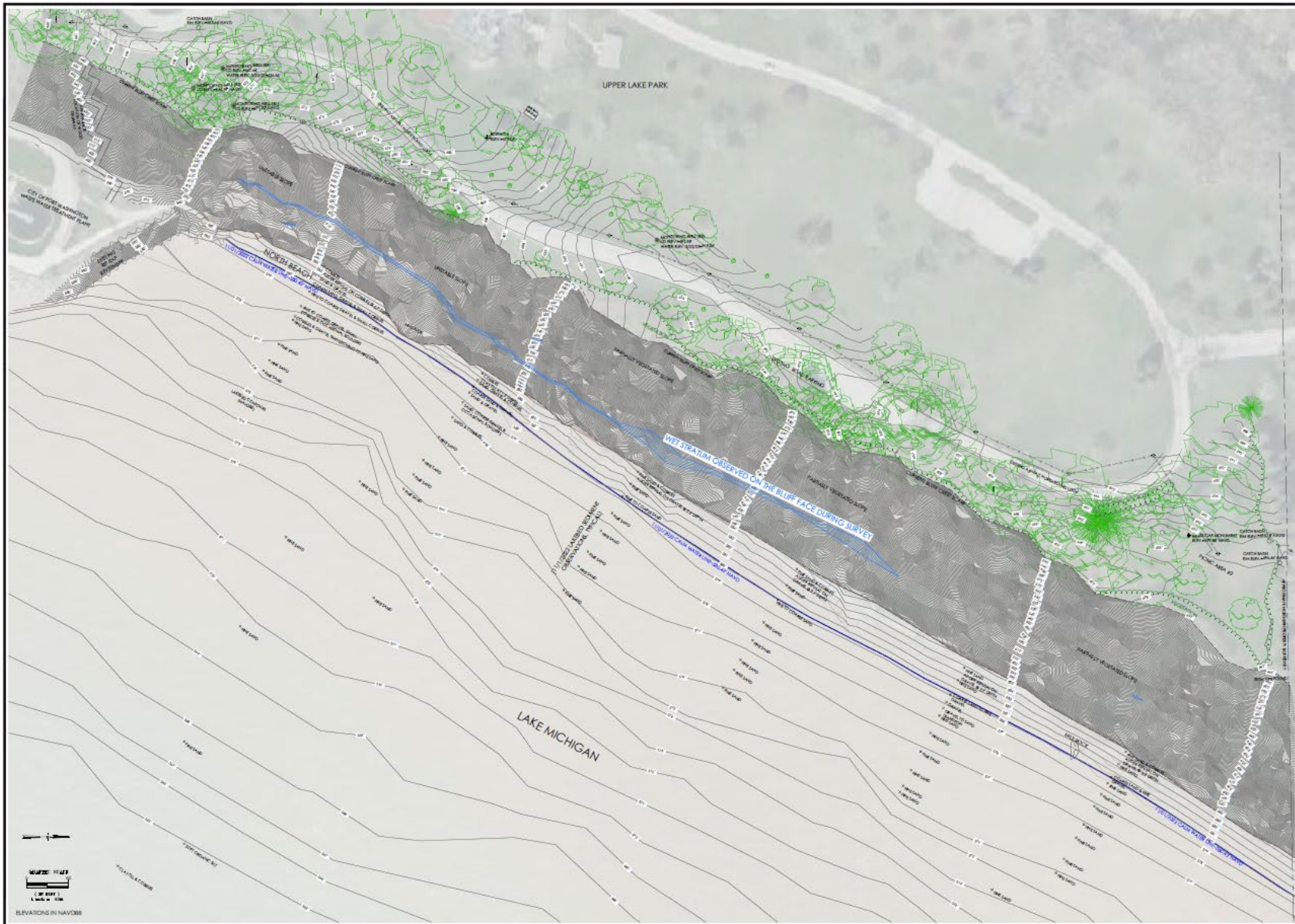
# 2022 OBLIQUE IMAGES



Images Courtesy of WI Coastal Management Program

# SCOPE OF SERVICES COMPLETED

- ▶ Concept Plan
- ▶ Topographic & Bathymetric Survey
- ▶ Three Soil Exploration Borings
- ▶ Wave & Shore Erosion Analyses
- ▶ Schematic Plans & Estimated Construction Costs
- ▶ Identification & Assistance with Grant Sources



EXISTING CONDITIONS MAP

4328 S. 11th Street  
 Milwaukee, WI 53241-1877  
 Phone: (772) 484-5144  
 Fax: (772) 484-5144  
 www.miller-engineers.com

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NO.	REV.	DATE	BY	CHK.	APP.	DESC.

**UPPER LAKE PARK BEACH & BLUFF REHABILITATION**  
 CITY OF PORT WASHINGTON  
 498 N. LAKE STREET  
 PORT WASHINGTON, WI

SCALE	HOR.	1"=40'
SCALE	VER.	1"=40'
DATE	03/24/2023	
JOB	20A15-6	
BY	EBB	
CL	RCM	
SHEET	1	2
OF	1	2



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# 1996 OBLIQUE IMAGES

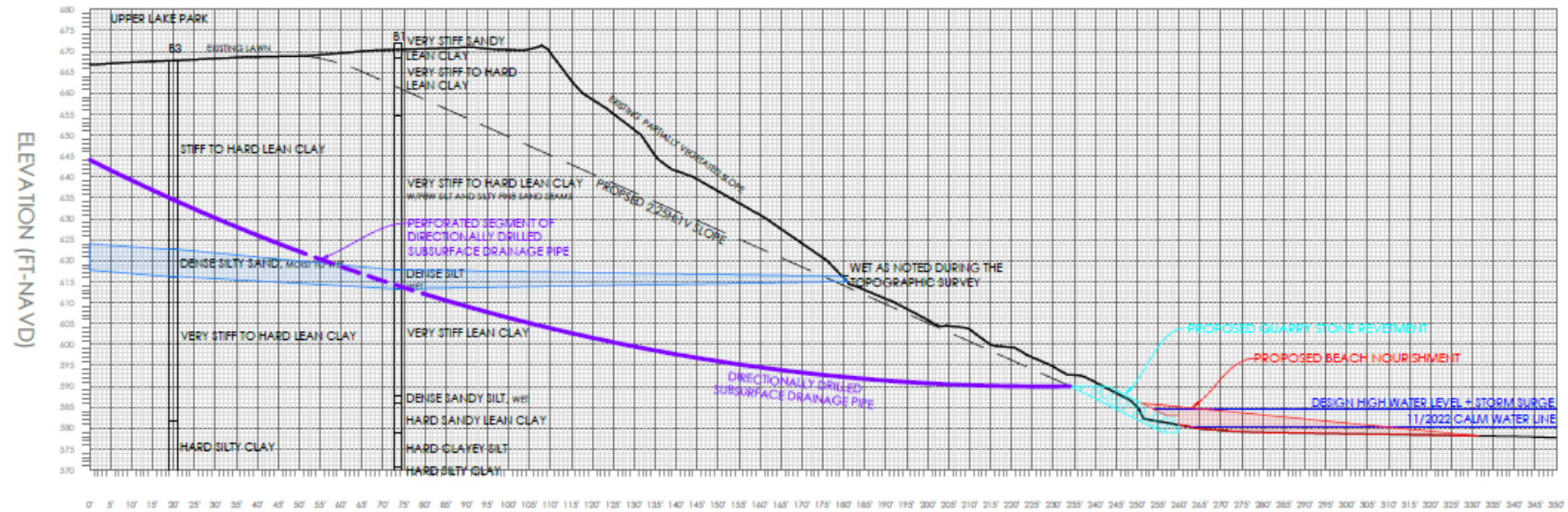


Images Courtesy of WI Coastal Management Program  
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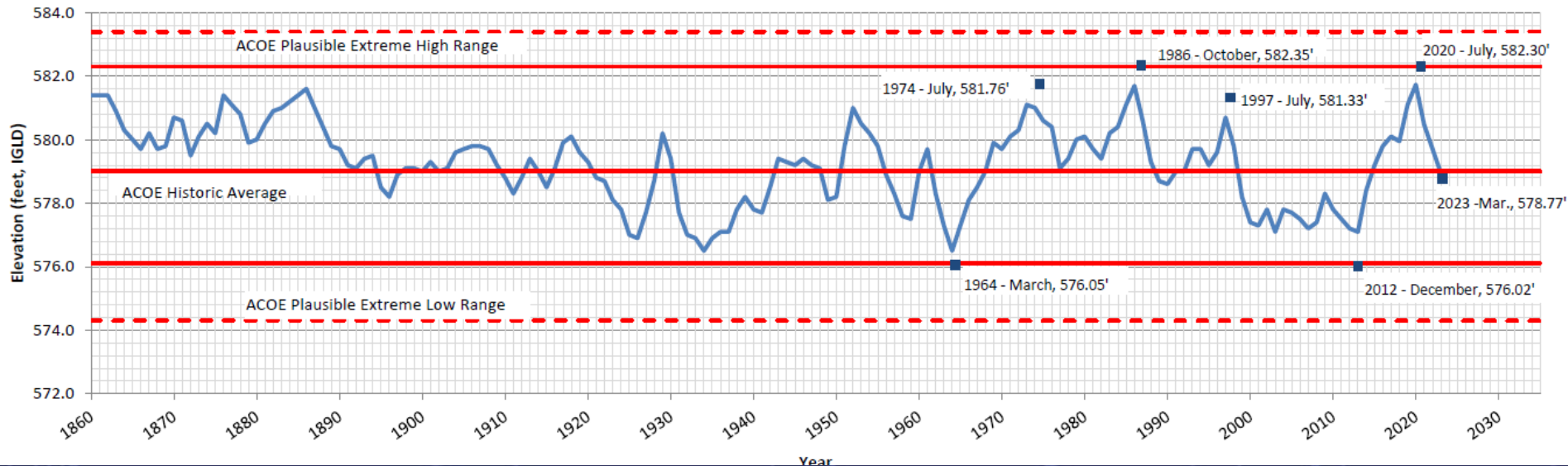


## BLUFF CROSS SECTION A-A' (B1 THROUGH B3)



# LAKE MICHIGAN-HURON WATER LEVEL FLUCTUATIONS

Lake Michigan - Huron  
Annual Average Water Levels



# AERIAL IMAGES

1990



2020

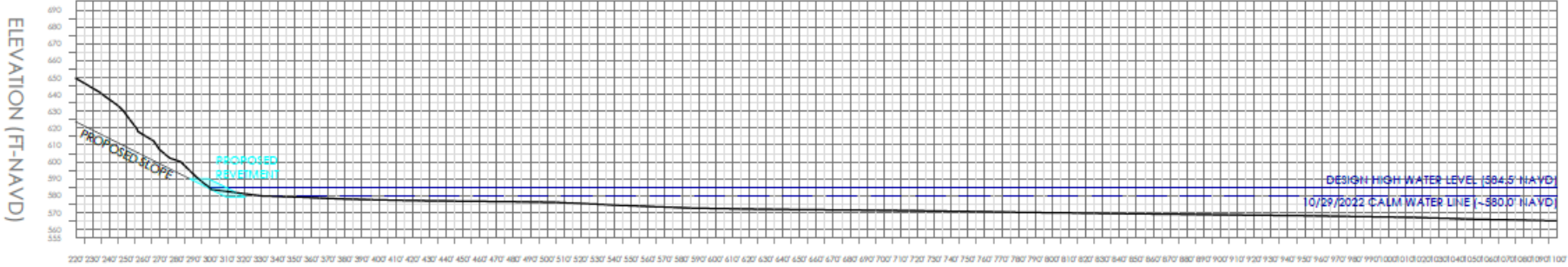


Images Courtesy of Ozaukee County GIS

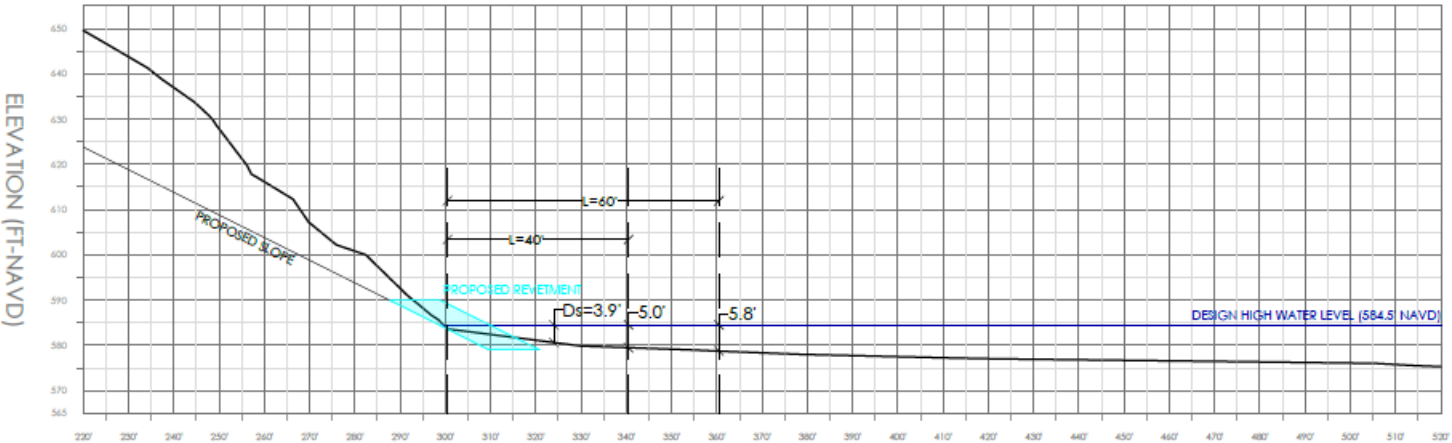
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NEAR SHORE PROFILE (BATHYMETRIC SURVEY PERFORMED ON 10/29/2022)

SCALE: 1"=70'



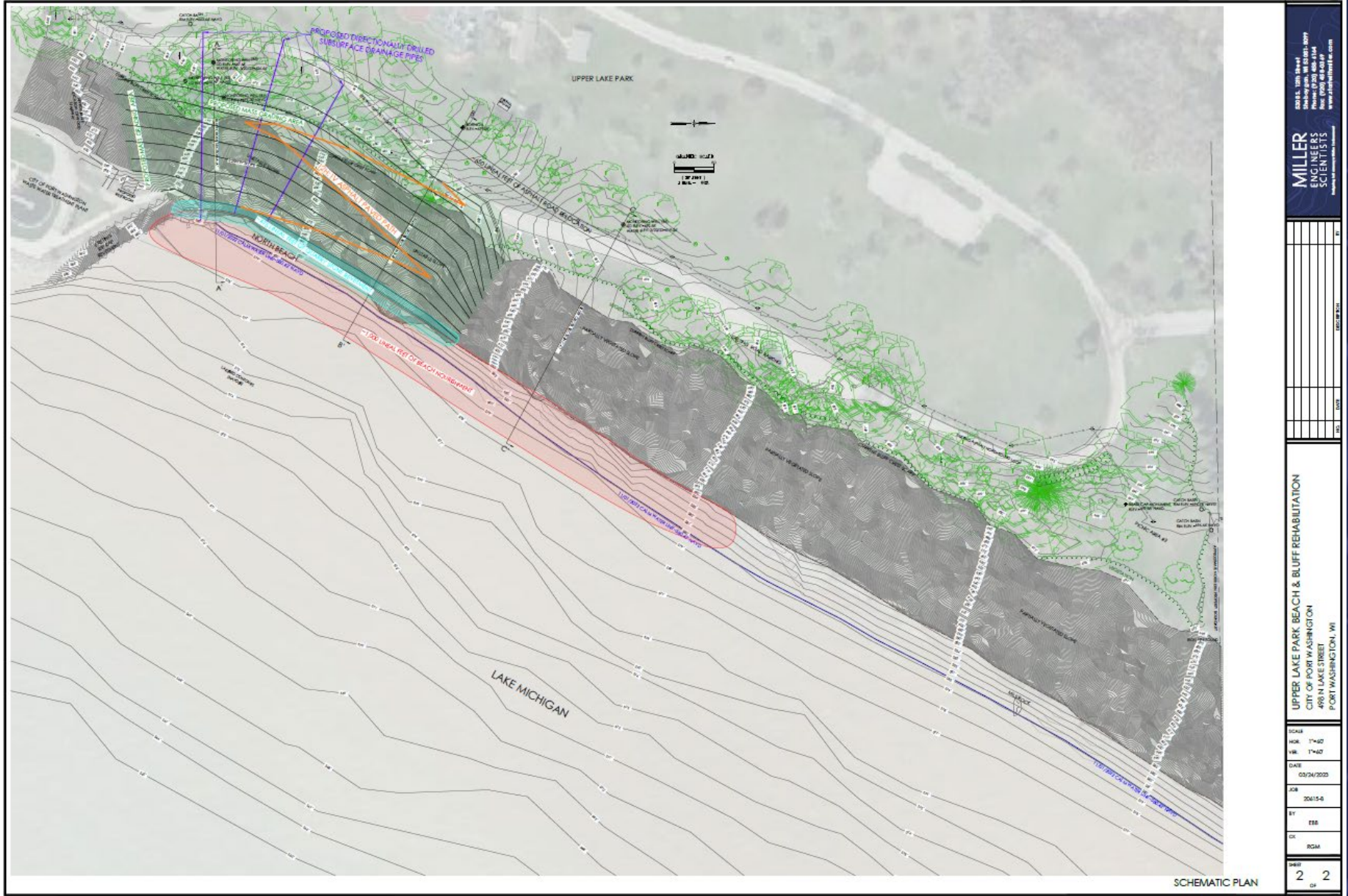
SCALE: 1"=30'



# ENGINEERS ESTIMATE OF PROBABLE CONSTRUCTION COST

<b>Task Item</b>	<b>Estimated Budget (in Thousands of Dollars)</b>
Final Design, Permitting, & Grant Assistance	\$150
Directionally Drilled Subsurface Drain Lines	\$80 to \$100
Bluff Excavation & Pathway (1,200 lineal ft.)	\$4,600 to \$7,000
Revetment (950 lineal feet)	\$1,700 to 2,300
Beach Nourishment (1,300 lineal feet)	\$500 to \$700
Periodic Inspection & Administration	\$150
<b>Total</b>	<b>\$7,180 to \$10,400</b>

# SCHEMATIC PLAN – REDUCED ALTERNATIVE B



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 Fax: (762) 486-1149  
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NO.	DATE	DESCRIPTION

UPPER LAKE PARK BEACH & BLUFF REHABILITATION  
 CITY OF PORT WASHINGTON  
 496 N LAKE STREET  
 PORT WASHINGTON, WI

SCALE  
 HOR. 1"=40'  
 VER. 1"=40'  
 DATE 03/24/2023  
 JOB 206154  
 BY ERS  
 CK RGM  
 SHEET 2 OF 2

# ENGINEERS ESTIMATE OF PROBABLE CONSTRUCTION COST - REDUCED ALTERNATIVE B

<b>Task Item</b>	<b>Estimated Budget (in Thousands of Dollars)</b>
Final Design, Permitting, & Grant Assistance	\$150
Directionally Drilled Subsurface Drain Lines	\$80 to \$100
Bluff Excavation & Pathway (600 lineal feet)	\$2,300 to \$4,500
Revetment (475 lineal feet)	\$850 to 1,150
Beach Nourishment (1,300 lineal feet)	\$390 to \$540
Periodic Inspection & Administration	\$150
<b>Total</b>	<b>\$3,920 to \$6,590</b>



# GRANT APPLICATIONS

Grant	Status	Task	Grant Dollars
<i>Current Applications</i>			
Fund for Lake Michigan	Received	Schematic Plan Development	\$53,000
WI Coastal Management Program	Received	Final Design & Permitting	Requires 60% Match (Covers \$60,000)
Sea Grant	Pending	Research & Education	\$260,000
<i>Additional Options</i>			
Sustain our Great Lakes	Option	Construction	\$100-\$350,000
FEMA	Option	Design & Construction	75% match, reasonable cost
Knowles-Nelson Stewardship	Option	Construction & Development	50% match, \$100,000 limit for trails

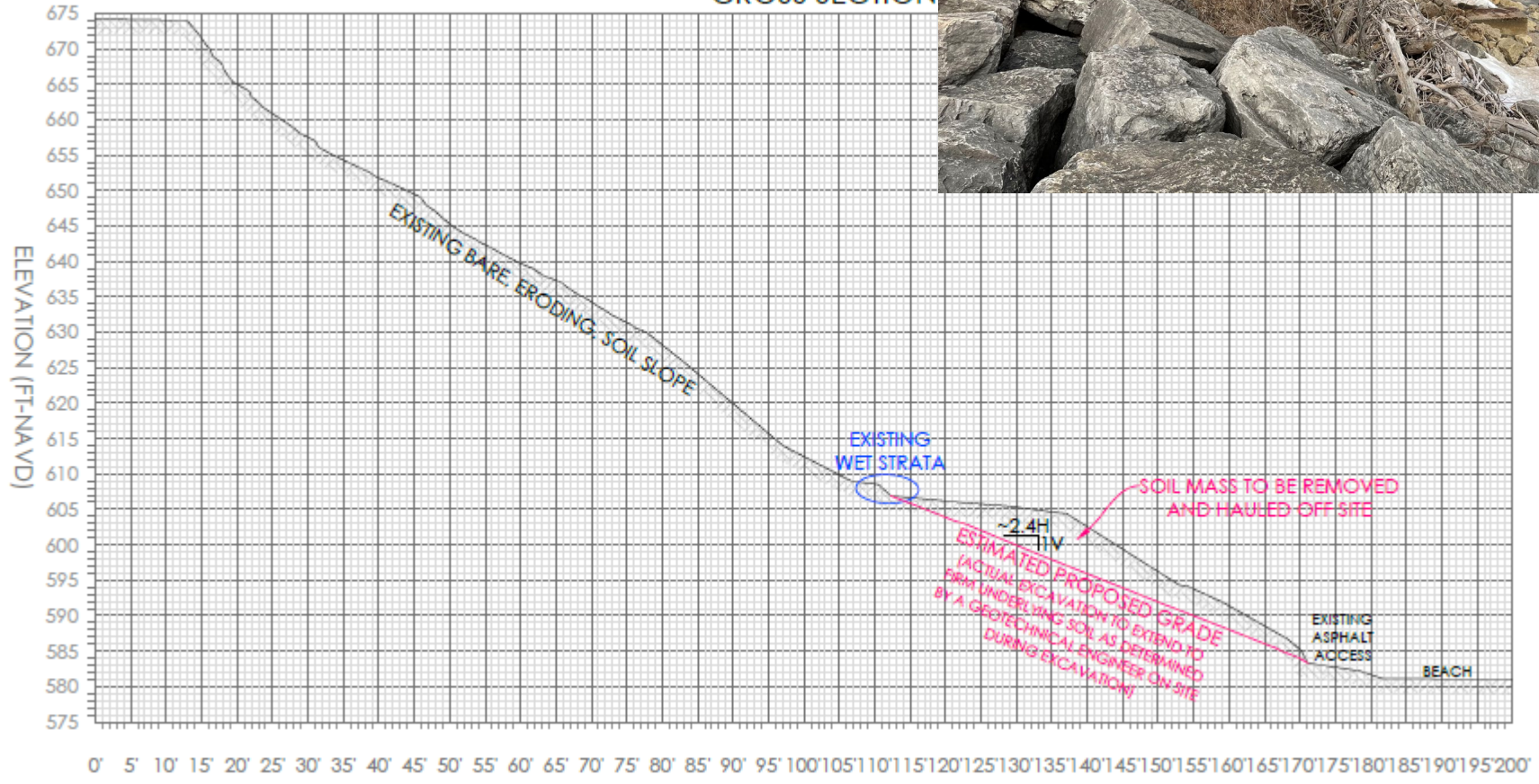
# NEXT PROJECT STEPS

The next project steps consists of:

- ▶ City Financial Planning
- ▶ Grant Applications
- ▶ Final Plans & Specifications
- ▶ Reconstruction of a portion of the road, Installation of Directionally Drilled Subsurface Drainage Pipes, and minor grading



CROSS SECTION



Roger G. Miller, PE

Emily Blum, PE

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***Designing in Harmony with the Environment***

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